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TOPOGRAPHIC SURVEYS OF NEW JERSEY, MASSACHUSETTS AND OHIO.

Over fifteen years ago there was completed a topographic survey of the entire State of New Jersey, which was published on the scale of one mile to one inch, with contours having an interval of 10 and 20 feet. With the State of Massachusetts New Jersey shared the honour of being the first to have such a survey made, and in both cases the resulting maps have exerted potent influence for the development of water and sanitary works under State supervision, and of systems of well-constructed and well-maintained highways.

In both cases this work was executed in co-operation with the United States Geological Survey. Massachusetts left the entire supervision and conduct of the work to the Federal bureau, furnishing half the fund. New Jersey, however, stands alone among the States of the Union in having at first commenced, and in having wisely and economically carried out the survey of its own territory, under the sole direction of State officers. The late State Geologist, Dr. Cook, was in general charge of the Geological Survey of New Jersey, and under him the immediate technical conduct of the work was efficiently executed by Mr. C. C. Vermeule. After the survey was about half finished the State sought and received the co-operative aid of the United States Survey, but those in charge of the latter were so well satisfied with the quality of the work done that they reversed their usual procedure, and left the remaining work to be done by the same able hands, merely supplying the needed funds.

Within the last few years the present State Geologist, Dr. H. B. Kümmel, has undertaken a complete revision of the existing maps, the principal changes found necessary being in culture, chiefly the addition of new roads, streets, railroads, etc. This work is being carried on under Mr. Vermeule. While the results of the first survey were published on a scale of one mile to an inch, the manuscript maps were drawn on a much larger scale. In consequence, the results of the resurvey are being prepared for publication on the large scale of 2,000 feet to one inch for all the more densely-inhabited portion of the State, or at a scale of nearly three inches to one mile.

Already about a dozen map sheets of the new survey have been issued, and they are the most useful and the most satisfactory topographic maps yet published of any large area of the United States. The scale is so large that it has been possible to add the names of all streets in the cities and villages, and, in consequence, these maps will be found especially useful to those engaged in engineering or allied work in the urban district.

During the present year the United States Geological Survey has taken a hand in this revision, with a view to hastening its completion; and it contemplates the resurvey this season of the unrevised portions of six sheets about High Bridge, Hackettstown, Lake Hopatcong, Somerville, Plainfield, and Morristown, or an area of nearly 1,200 square miles. It is reported, to the great credit of those who made the original surveys on the smaller scale, that practically no errors have been found in culture, and that the contour topographic sketching is remarkably good, though somewhat generalized in places, and lacking the detail shown in the later maps of the Federal survey. Unfortunately, it has not been found possible to incur the expenditure required to revise the contour sketching as well as the culture.

The State of Massachusetts, like New Jersey, did not stop with the completion of its topographic survey, but has been ever since actively engaged on kindred work. It has thus far done nothing towards the revision of the existing maps, but has entered upon a cadastral survey of the commonwealth. This work consists in extending a minute system of triangulation of the highest order of geodetic precision over the State, whereby permanent monuments are located at intervals of a few miles. Several of these are placed on the boundaries of each township, and the outlines of the latter are then traversed with an accurate tape and transit survey tied to the triangulation monuments. The result is to furnish a vast system of precisely-located political and property lines to which all future property lines can be tied. In addition, these cadastral surveys will furnish the instrumental control on which at some future time a thorough and accurate revision of the topographic survey can be based.

This is, in fact, what has recently been done by the United States Geological Survey for the Metropolitan District of Boston, and the result is about to be published in a new edition of the Boston and Boston Bay sheets. Towards the construction of these sheets there were available many hundreds of geodetic positions, chiefly on town boundaries, but including also church spires, factory chimneys, hill-tops, etc. Numerous lines of spirit levels were run over the whole area of survey, and the finished map is of sufficient accuracy to furnish a base on which not only to plan but even to project the extension of roads, railroads, and the plans of other engineering works. A preliminary but limited edition of this map, in the form of a black-and-white photo-lithograph, has already been issued on the large scale of over two inches to one mile, and has been found most useful by the various metropolitan bureaux.

TOPOGRAPHY OF OHIO.

The diverse topographic features of the State of Ohio are well brought out in the series of maps which are rapidly following one another from the presses of the United States Geological Survey, as a result of the liberal appropriations towards co-operative topographic surveys made by the last two legislatures of the State.

Already, after only three seasons of field work, the survey of thirty-two sheets has been completed. These represent the topography, on a scale of one mile to one inch and with contours of 10 and 20 feet, of nearly 6,000 square miles. Two widely-divergent types of topography are represented by the northwestern and the southeastern portions of the State. The Sandusky sheet, for example, had to be mapped with contour interval of 10 feet in order that the very gentle slopes along the low-lying lands on Lake Erie might be properly represented. The country is quite level, the uniformity of the slopes being broken by two features characteristic of the entire lake border series of sheets. These are clearly-defined terraces and benches outlining old lake beaches, and deep-cut ravines which carry the drainage from the uplands to the south into Lake Erie. The old shore-lines, as marked by the beach terraces, are a delight to the student of geology, and these, as well as the deep-cut ravines, are, perhaps, best expressed by the Cleveland sheet, through which the Cuyahoga Creek meanders in a deeply-eroded channel.

In the southeastern portion of the State the higher summits of the country mark the general level of an upland or plateau of nearly uniform elevation and gentle inclination. The surface of this plateau has been deeply and minutely eroded by myriads of little streams draining into the Ohio River. A fine example of this topographic type is shown in the Parkersburg sheet, a preliminary photo-lithograph of which has just been issued. The minuteness with which this exceedingly detailed topography has been mapped is such that the map is very difficult to read; yet had any larger contour interval than 20 feet been used much of the value and accuracy of the map would have been lost.

H. M. W.